"Antibiotic resistance is a worldwide problem. New forms of antibiotic resistance can cross international boundaries and spread between continents with ease. World health leaders have described antibiotic-resistant microorganisms as "nightmare bacteria" that "pose a catastrophic threat" to people in every country in the world."

- Antibiotic Resistance Threats, 2013, CDC

Microbial Threats

Contents

Healthcare Associated Infections

Healthcare-associated infections (HAIs) are among the greatest causes of preventable injuries and deaths in the United States. Every day about one in 25 hospital patients has at least one HAI and there were an estimated 722,000 HAIs in U.S. acute care hospitals in 2011. In this same year, about 75,000 hospital patients with HAIs died.[1] However, HAIs are not solely the result of receiving medical treatment in a hospital. Recent studies show an increase in the prevalence of HAIs that can be linked to outpatient care or treatment received in an assisted living facility or nursing home. Unfortunately, there is limited data available on the specific burden of HAIs that are acquired outside of the hospital. However, it is estimated that up to 3 million infections and 380,000 HAI related deaths occur each year in long term care facilities (LTCFs).[2] Agencies such as the Centers for Disease Control and Prevention and the Agency for Healthcare Research and Quality (AHRQ) note that current figures may actually underestimate the true impact of HAIs outside of the hospital setting. As a result of the significant and preventable burden to human life and the US healthcare system caused by HAIs, the U.S Department of Health and Human Services has identified the prevention and reduction of HAIs as a top priority.

In the 2013 HAI report by the NH DHHS, the data is presented as both standardized infection ratios (SIRs) and rates. SIRs allow for data to be aggregated across risk groups, procedures and hospitals, it does not give the infection rate but a comparison between how many infections occurred and how many were predicted to occur based on national data. In the state of New Hampshire, 2013 HAI rates were lower than predicted based on the national baseline with a SIR of 0.70 or 30% fewer infections than would be expected.[3] A total of 112 surgical site infections were reported in hospitals, with 13% (n=15) of those occurring in Nashua. This exceeds the HHS target of 0.75 (25% reduction in HAIs). SSIs however are still the most common HAI reported in the state of New Hampshire, accounting for 60% of reportable HAIs statewide. Other reportable HAIs in the state include central-line blood stream infections (CLABSI) and catheter-associated urinary tract infections (CAUTI). A total of 15 CLABSI cases were reported in 2013, 66% fewer than predicted. NH has not yet met the HP2020 goal of a 0.25 SIR for CLABSI, but holds a much lower SIR than the nation (SIR = 0.56). 56 CAUTI cases were reported statewide, 4% more than would be expected. In 2013, Nashua reported 2 cases of CAUTI and there were no reported incidences of CLABSI.

Table 7.1 Standardized Infection Ratios, US and NH

	C. difficile	CAUTI	SSI	CLABSI	MRSA	Overall HAI
2013 SIR Target	**0.70**	**0.75**	**0.75**	**0.50**	**0.75**	**0.60**
National 2012 SIR	**0.98**	**1.02**	**0.80**	**0.56**	**0.97**	*
NH 2013 SIR	*	**1.04**	**0.68**	**0.34**	*	**0.70**

*Data not Available

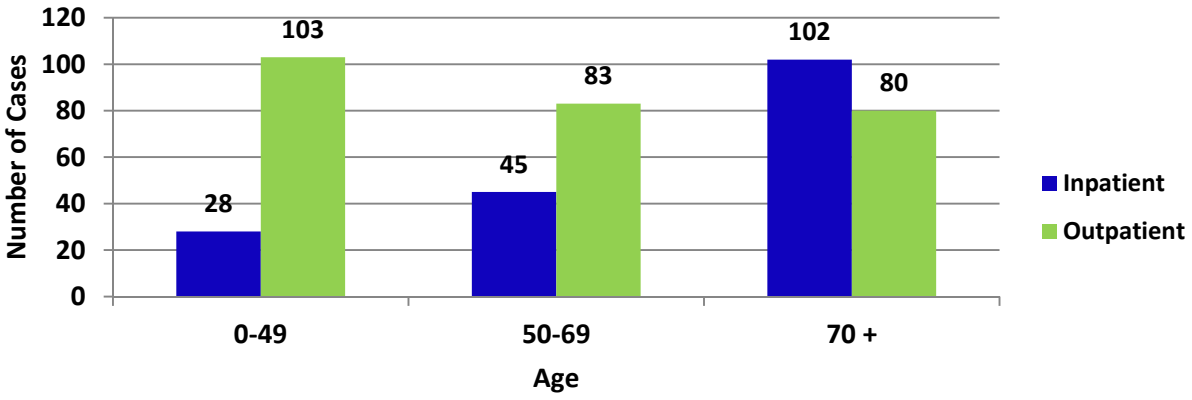
Source: US HHS, NH DHHS

Clostridium difficile

From 2005 to 2009, there were 426 deaths with intestinal infection due to *C. difficile* as an underlying or contributing cause in adults ages 55 and older.

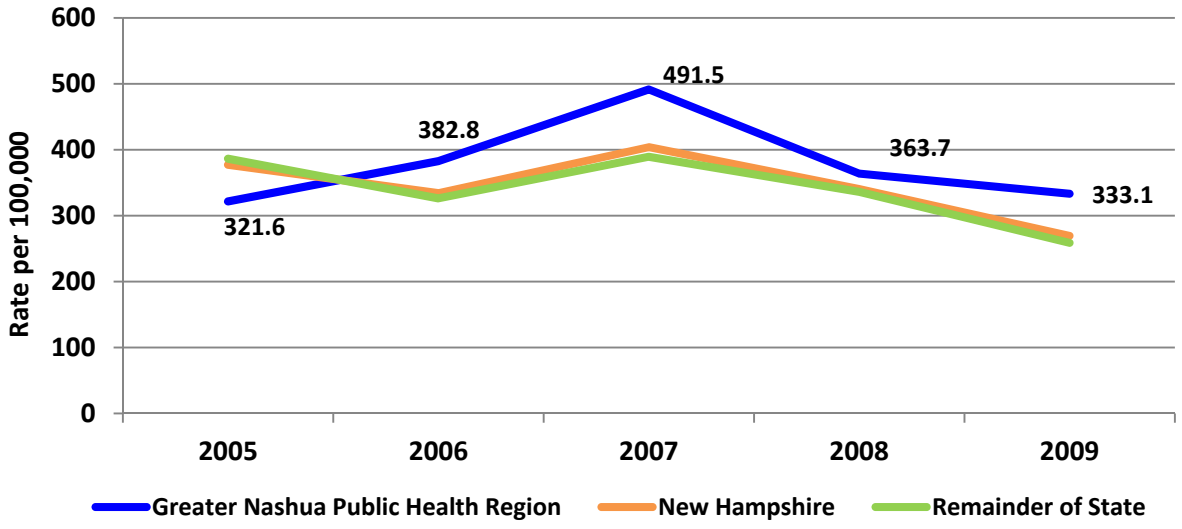
Although New Hampshire hospitals are only required to report cases of SSI, CAUTI, and CLABSI, there are other HAIs such as *Clostridium difficile*. When an individual takes certain antibiotics for a high or prolonged period of time, the normal bacterial flora of the gut is disrupted. If this individual is colonized or exposed to *Clostridium difficile* then they are at risk for developing illness. Patients can be exposed by the hands of a healthcare worker who cared for a *C. difficile* patient or a contaminated surface. *C. difficile* bacteria produce a toxin that is capable of causing diarrhea, kidney failure, sepsis and death. Risk of death is greatest in the elderly, with mortality rates having the potential to exceed 10%.[4] In 2000, a more virulent strain of *C. difficile* began to spread throughout the United States, triggering a 400% increase in *C. difficile* related deaths for the following seven years.[5] *Clostridium difficile* infection (CDI) is estimated to increase the length of hospital stay between 2.8 to 5.5 days and cost US hospitals upwards of $1 billion dollars each year.[6] In 2013, Nashua observed a total of 441 CDIs, with 70% occurring in individuals aged 50 and older (Figure 7.1). Although 40% of these cases occurred in hospitals (n=175), CDI cases with hospital onset accounted for only 50 cases. The majority of cases were observed in outpatient settings with individuals 50-59 and 70-79 experiencing the highest number of cases. The Association for Professionals in Infection Control and Epidemiology estimates that the average cost of inpatient CDI is approximately $35,000; meaning that 175 hospitalized cases of *C. difficile* cost the Nashua healthcare system over $6 million dollars in 2013. Furthermore, it is estimated that CDI recurs in at least 20% of cases even with appropriate treatment, which further increases the burden felt by both patients and healthcare providers.[7] In NH from 2005 to 2009, there were 426 deaths with intestinal infection due to *C. difficile* as an underlying or contributing cause in adults ages 55 and older.[28]

Figure 7.1 *Clostridium difficile* Cases, All Ages, Nashua, 2013



Source: Northeast Healthcare Quality Foundation, Greater Nashua C. difficile Collaborative

Figure 7.2 Inpatient Hospital Discharges, *Clostridium difficile*, Primary or Secondary Diagnosis, Ages 55 and Older



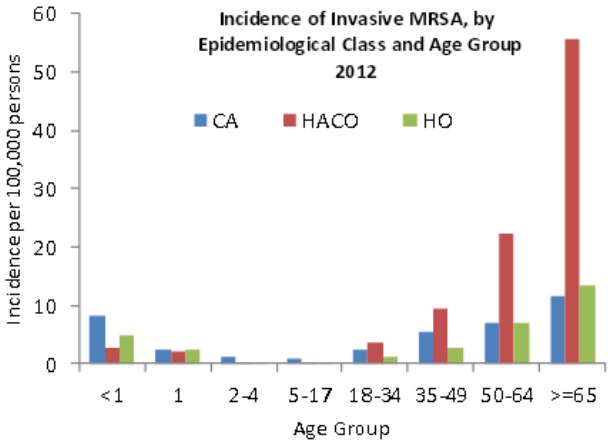
Source: NH DHHS

Methicillin Resistant *Staphylococcus aureus*

Of the 16% of all HAIs that are caused by multidrug resistant organisms, half are related to methicillin-resistant staphylococcus aureus, or MRSA.[8] In 2009, there were an estimated 94,000 invasive MRSA infections contributing to 18,000 deaths in the United States. Data from the National Healthcare Safety Network (NHSN) indicates that from 2009 to 2010, MRSA accounted for the following percentage of *S. aureus* related HAIs: 54.6% CLABSI, 58.7% CAUTI, and 43.7% of SSIs.[9] Patients with a MRSA related SSI have been reported to have a 3.4 greater risk of death and median healthcare costs that are almost twice as great as those with a methicillin susceptible *S. aureus* infection ($14,000 versus $7,600)[10]. The CDC reports that MRSA is still a large patient threat but rates of hospital onset invasive MRSA have declined 54% from 2005-2011.[11] As of 2012, individuals over 50 with healthcare-associated, community onset cases of MRSA have the greatest incidence of invasive disease, over double that of individuals of the same age with community acquired or hospital onset disease (Figure 7.3). The Society for Healthcare Epidemiology of America (SHEA) promotes recommendations for all acute care facilities, including conducting a MRSA risk assessment to identify the opportunity of transmission in the facility and educating staff, patients and families on MRSA and recommended precautions.

Figure 7.3 Invasive MRSA, US, 2012

Source: Active Bacterial Core Surveillance Report, 2012



The use of antibiotics, has improved the health outcomes of millions of individuals since the 1920s, but they carry some risk of adverse complications. When antibiotics are used inappropriately or for longer than necessary, the patient's risk of suffering an adverse event such as acquiring CDI, increases. The CDC estimates that up to half of all antibiotics are used incorrectly.[12] In LTCFs, there is a 50-70% likelihood that a resident will receive at least one course of antibiotics during a one year period.[13] Antibiotic resistant infections are estimated to cause a minimum of 2 million illnesses and 23,000 deaths in the U.S. each year and the threat continues to increase. The CDC is working with health departments and healthcare facilities to stress prevention and take actions such as preventing infections and the spread of infections in the healthcare system, tracking resistant bacteria, improving the use of antibiotics and promoting the development of new antibiotics. Aggressive action is needed to keep new resistance from developing and to prevent the resistance that already exists from spreading. [14]

As a patient, what can I do to prevent healthcare associated infections?

- **Talk to your doctor about your procedure(s) and if you have a catheter, ask if it is necessary each day. Ask your healthcare provider how they prevent surgical site infections and how you can prepare for surgery to reduce your infection risk.**
- **Wash your hands and make sure your healthcare providers wash their hands before touching you.**
- **Don't take antibiotics for viral infections and make sure your healthcare provider is checking to make sure the right antibiotic is prescribed.**
- **Know the signs and symptoms of infection and tell your healthcare provider.**
- **Tell your healthcare provider if you have 3 or more diarrhea episodes in 24 hours, especially if you are taking an antibiotic.**
- **Get vaccinated against the flu and other infections to avoid complications.**

For more information, visit the CDC website at http://www.cdc.gov/HAI/patientSafety/patient-safety.html.

Foodborne & Waterborne Diseases

About 1 in 6 people, or 48 million people, in the United States will get ill from a foodborne illness each year and there will be about 1,000 foodborne outbreaks in the United States every year. This causes 128,000 hospitalizations and 3,000 deaths as a result of foodborne diseases. There are 31 pathogens known to cause foodborne illness and if we reduce foodborne illness by 10%, we would keep 5 million

Americans from getting ill each year. One cause of foodborne illness, Salmonella, has caused more hospitalizations and deaths than any other type of pathogen and costs $365 million in direct medical costs annually. Poultry and eggs are the most commonly contaminated food items with Salmonella.[15] From 2009 to 2013 in Nashua, there were 58 cases of Salmonella. In the same time frame there were an additional 125 cases of foodborne and waterborne diseases (Table 7.1).[16] There are many ways to prevent foodborne and waterborne diseases including safe food handling, proper food storage and safe manufacturing practices. A CDC infographic explains these preventative measures in figure 7.4.[15]

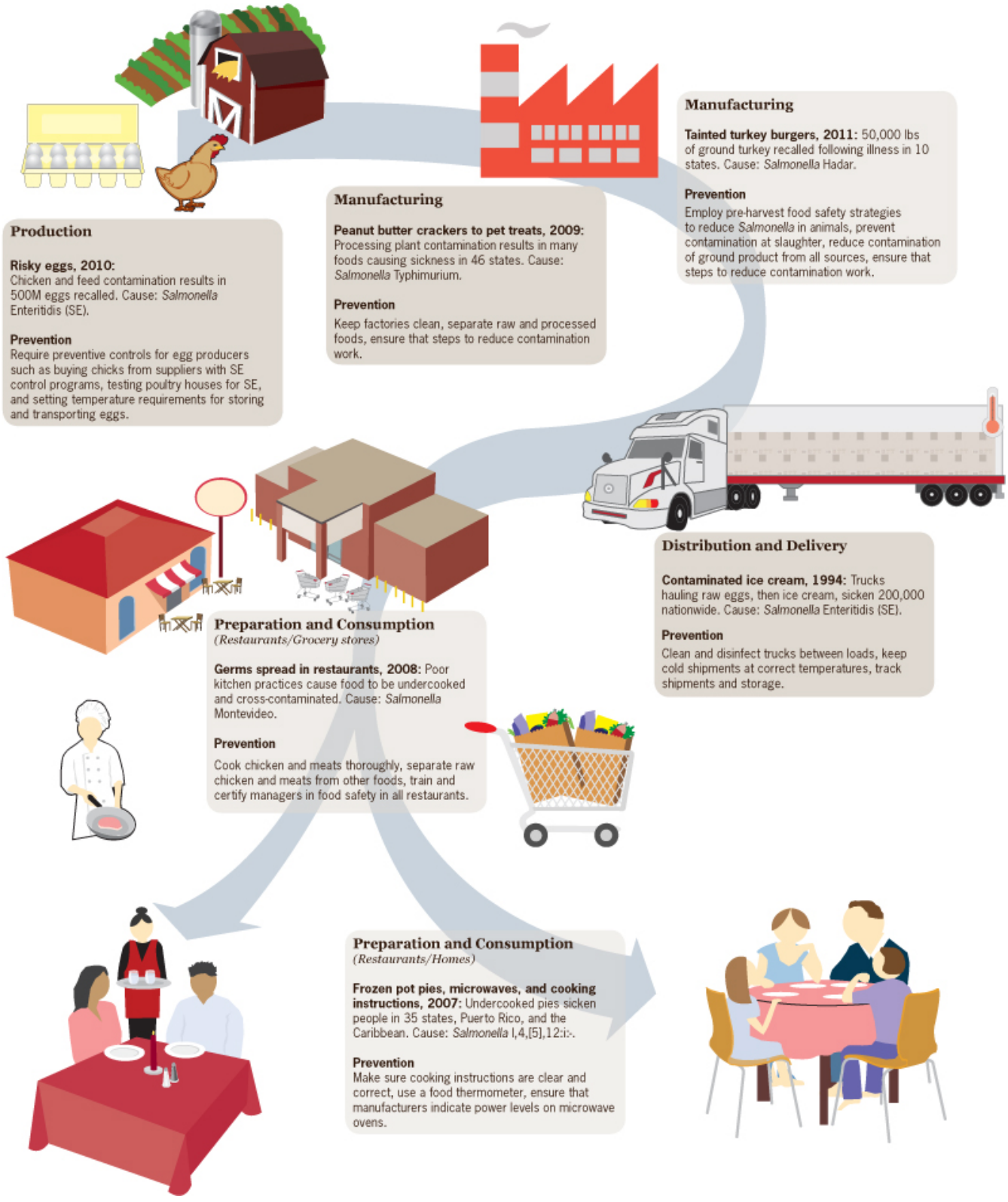
Table 7.1 Foodborne and Waterborne Diseases and Conditions in Nashua, 2009-2013

City of Nashua, NH					
Disease/Condition	**2009**	**2010**	**2011**	**2012**	**2013**
Campylobacteriosis	11	15	17	9	14
Cryptosporidiosis	6	3	2	1	1
Cyclospora Infection	0	0	0	0	0
***E. coli*, Shiga toxin**	0	1	2	1	2
Giardiasis	6	5	6	3	2
Hepatitis A	2	0	0	0	0
Listeriosis	0	1	0	0	0
Salmonellosis	16	11	11	8	12
Shigellosis	10	0	0	0	0
Vibriosis	1	0	0	1	1
Yersiniosis	1	0	0	1	0
Source: NH DHHS; City of Nashua DPHCS					

Figure 7.4 Preventing Foodborne Illnesses

Precautions to Prevent Illness

CLEAN: Wash your hands with soap and water before preparing food. Wash cutting boards, dishes, utensils (including knives), and counter tops with hot, soapy water *after* preparing *each* food item and *before* going on to the next food.
SEPARATE: Don't cross-contaminate one food with another.
COOK: meat, poultry and eggs thoroughly.
CHILL: Refrigerate leftovers promptly.
REPORT: Report suspected foodborne illnesses to the health department.


Production
Risky eggs, 2010:
Chicken and feed contamination results in 500M eggs recalled. Cause: Salmonella Enteritidis (SE).
Prevention
Require preventive controls for egg producers such as buying chicks from suppliers with SE control programs, testing poultry houses for SE, and setting temperature requirements for storing and transporting eggs.
Manufacturing
Peanut butter crackers to pet treats, 2009: Processing plant contamination results in many foods causing sickness in 46 states. Cause: Salmonella Typhimurium.
Prevention
Keep factories clean, separate raw and processed foods, ensure that steps to reduce contamination work.
Manufacturing
Tainted turkey burgers, 2011: 50,000 lbs of ground turkey recalled following illness in 10 states. Cause: Salmonella Hadar.
Prevention
Employ pre-harvest food safety strategies to reduce Salmonella in animals, prevent contamination at slaughter, reduce contamination of ground product from all sources, ensure that steps to reduce contamination work.
Distribution and Delivery
Contaminated ice cream, 1994: Trucks hauling raw eggs, then ice cream, sicken 200,000 nationwide. Cause: Salmonella Enteritidis (SE).
Prevention
Clean and disinfect trucks between loads, keep cold shipments at correct temperatures, track shipments and storage.
Preparation and Consumption
(Restaurants/Grocery stores)
Germs spread in restaurants, 2008: Poor kitchen practices cause food to be undercooked and cross-contaminated. Cause: Salmonella Montevideo.
Prevention
Cook chicken and meats thoroughly, separate raw chicken and meats from other foods, train and certify managers in food safety in all restaurants.
Preparation and Consumption
(Restaurants/Homes)
Frozen pot pies, microwaves, and cooking instructions, 2007: Undercooked pies sicken people in 35 states, Puerto Rico, and the Caribbean. Cause: Salmonella I,4,[5],12:i:-.
Prevention
Make sure cooking instructions are clear and correct, use a food thermometer, ensure that manufacturers indicate power levels on microwave ovens.

Source: CDC

Vector-borne Diseases

Most vector-borne diseases, or diseases that are transmitted to people by blood-sucking arthropods (insects or arachnids), can infect animals and humans. These diseases can be difficult to control because it relies on managing the vector, such as tick and mosquito populations.[17] In NH, tick-borne diseases such as Lyme disease, are the most prevalent vector-borne diseases. Mosquito-borne diseases such as West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) are also concerns in NH. From January to October 4, 2014, there were two humans, two animals and 18 mosquito batches that were positive for EEE. Only one of the EEE positive mosquito batches was in the GNPHR. There was only one mosquito batch that tested positive for WNV in the state. Mosquito batches are traps set-up in communities to capture mosquitoes that are then tested for WNV and EEE.[19] Nashua routinely collects and tests mosquitoes every summer and fall for WNV and EEE.

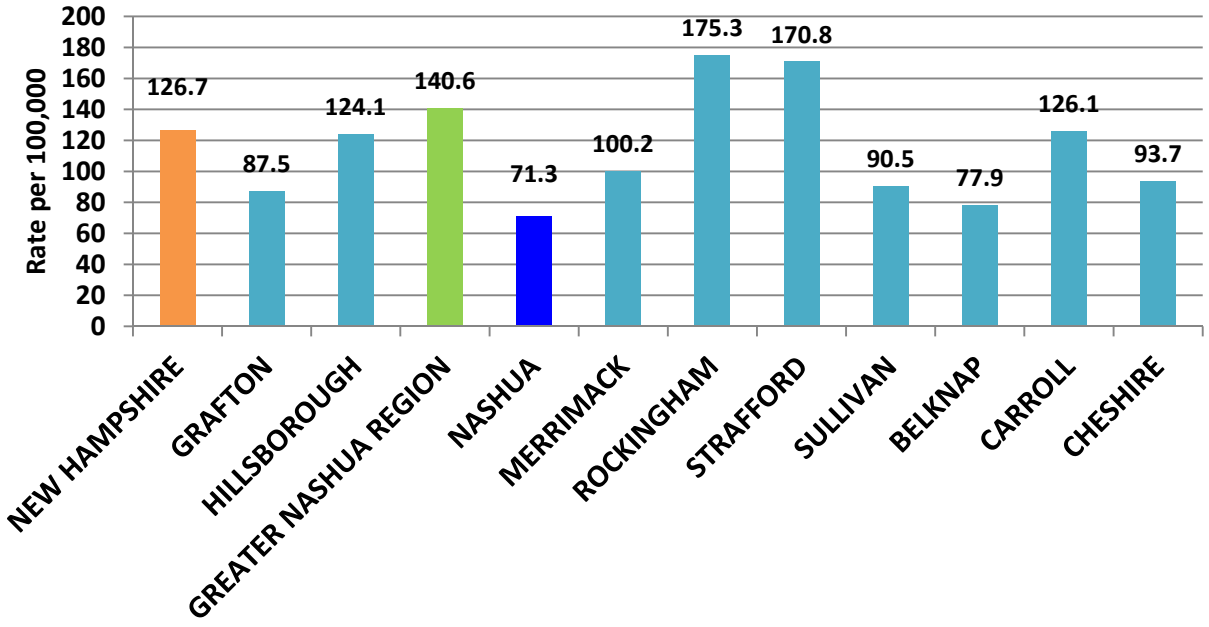
Changes in climate can influence transmission and the incidence of these diseases. When there are changes in temperature or precipitation patterns. With this change in climate, it can create a more ideal living environment for the vector making it easier for it to breed or survive. An example of climate change is the expansion of the blacklegged tick northward which will causes Lyme disease to continue to expand northward.[18]

Lyme Disease

In the early 1970's, Lyme, Connecticut and the surrounding towns started to see an increase of patients with mysterious cases of rheumatoid arthritis. Clinicians and researchers started to investigate these cases and during patient interviews, it was noted that many of the cases were from children that often played in the woods, which made them focus on the blacklegged tick population as a possible link. From here the researchers recorded the time of year and signs and symptoms of the cases to find commonalities and determine the cause of their illness. This eventually led to the identification of *Borrelia burgdorferi*, the bacteria that cause Lyme disease. In 2012, there were a total of 30,000 reported cases in the U.S. This was the highest reported vector-borne illness for that year. In the same year, New Hampshire had the highest incidence rate (incidence = the number of new cases) for Lyme disease. In 2013, the incidence for the state of New Hampshire was 126.7 cases per 100,000 people, the incidence for the GNPHR was 140.6 cases per 100,000 people and the incidence for Nashua was 71.3 per 100,000 people. The incidence in the GNPHR was significantly higher than Nashua (Table 7.2). In comparison to the counties in New Hampshire, the GNPHR ranks third in incidence for Lyme disease (Figure 7.5).

In 2013, there were 1,687 cases of Lyme disease in New Hampshire. It is most common in kids age's five to nine and the onset of symptoms is most commonly seen from June to August.

Figure 7.5 Incidence Rate of Lyme Disease Cases by Geography, 2013



Source: NH DHHS

In 2013, the Greater Nashua Public Health Region had 287 new cases and the City of Nashua had 62 new cases of Lyme disease (Table 7.2), which accounts for 17% of Lyme cases in New Hampshire.

Table 7.2 Incidence Rate and Number of Cases of Lyme Disease by Geography, 2013

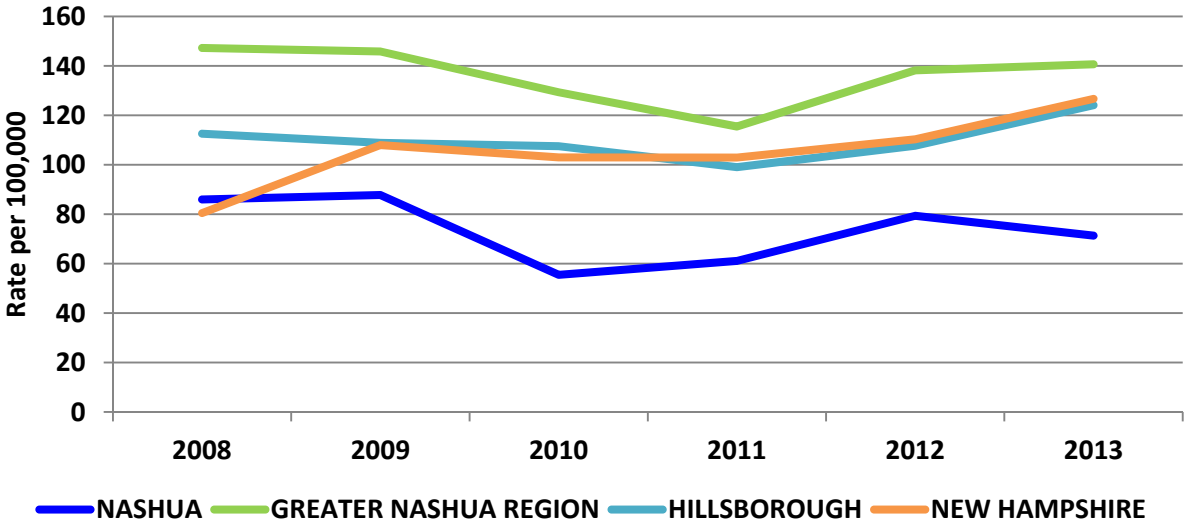
Geography	Number of Cases	Rate (per 100,000)	Confidence Interval
New Hampshire	1,687	126.7	104.6-148.7
Greater Nashua Public Health Region	287	140.6	117.4-163.9
Nashua	62	71.3	54.8-87.9
Source: NH DHHS			

The incidence rate of Lyme disease has remained consistent over the past five years with the Greater Nashua Public Health Region having a significantly higher rate than the City of Nashua in 2013. In 2012 and 2013, the rate for the region stayed around 140 cases per 100,000 (Figure 7.6).

Avoid Tick Bites:

- **Avoid woody and busy areas with high grass and leaf litter**
- **Walk in center of trails**
- **Use repellants with 20-30% DEET**
- **Bathe or shower after coming indoors**
- **Check yourself, your family, pets and gear for ticks**
- **Put clothes in dryer on high heat for an hour to kill ticks**

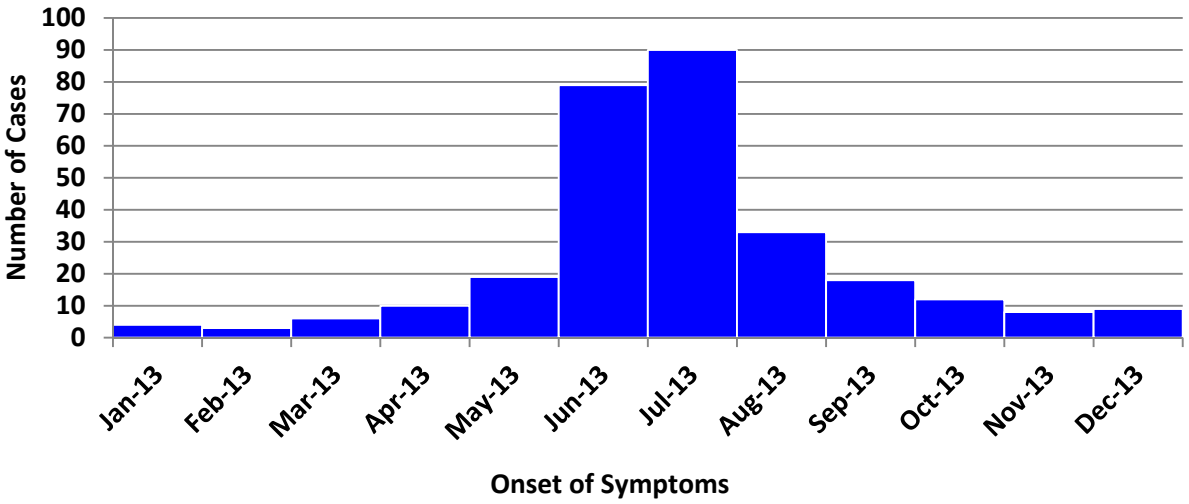
Figure 7.6 Lyme disease Incidence by Year and Geography, 2008-2013



Source: NH DHHS

Nationally, the onset of symptoms in Lyme disease cases mainly occurs in June, July and August which is a similar pattern to what we see in New Hampshire and the Greater Nashua Public Health Region. In 2013, the highest amounts of Lyme disease cases were in the months of June, July and August for Lyme disease cases in the GNPHR as this is when the blacklegged tick is in the nymph stage (Figure 7.7).

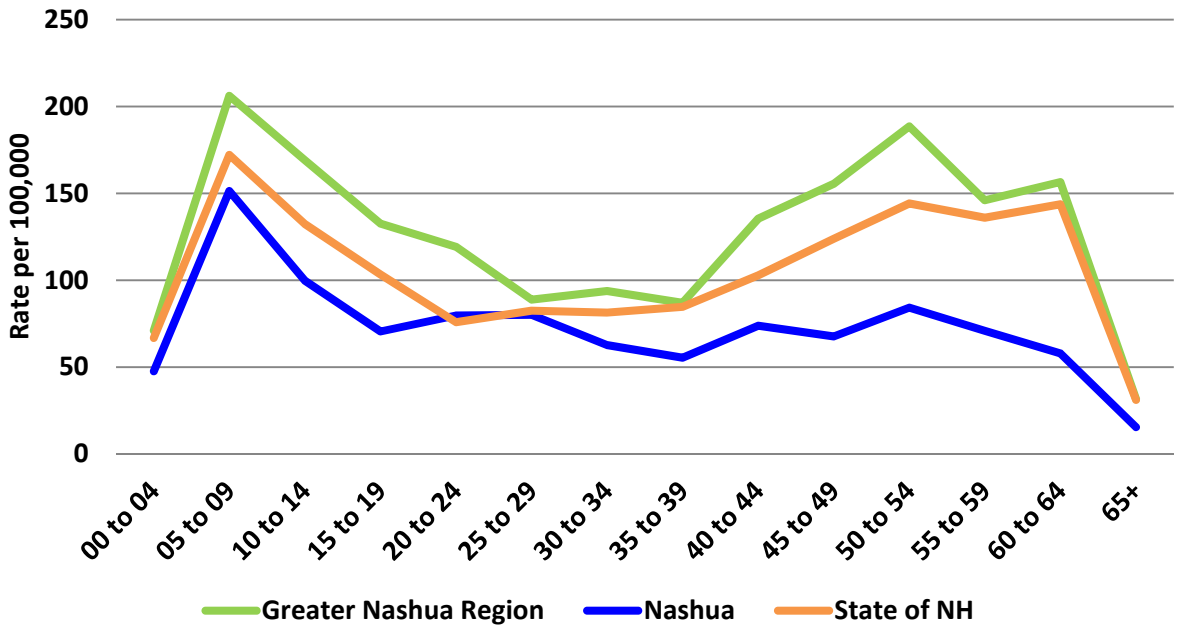
Figure 7.7 Lyme Disease Epi Curve, GNPHR, 2013



Source: NH DHHS

Lyme disease is most common among boys ages five to nine years of age. In Nashua and the Greater Nashua Public Health Region, the age groups that are most affected are ages five to 14 and 50 to 54 (Figure 7.8). From 2008-2013, 54.7% of cases in the GNPHR were male.

Figure 7.8 Rate of Lyme Disease by Age, 2008-2013



Source: NH DHHS

Tuberculosis

Tuberculosis, or TB, is caused by a bacterium called *Mycobacterium tuberculosis* that infects a person's lungs. If not treated properly, TB can be fatal. Not everyone infected with TB becomes sick with TB, this is called latent TB. In latent TB, the bacteria can live in the body without making the person sick and it does not make them infectious. Active TB is when someone develops symptoms of TB and can spread it to others. TB is spread through the air from one person to another when a person with TB coughs or sneezes. Individuals with HIV, chronic conditions such as diabetes, and abuse alcohol and illicit drugs are at higher risk for developing TB disease. Treatment is available for latent TB and active TB. It is important to treat latent TB to reduce the chances of becoming active TB.[20]

From 2004 to 2013, there were 136 cases of active TB in New Hampshire. Most cases were in Hillsborough County and in individuals that were foreign-born. From 2009 to 2013 there were 61 cases of active TB and 52 (85%) were in foreign-born individuals. The most common age category for active TB cases in NH was 25 to 44 years of age.[21] In Nashua from 2009 to 2013, there were 7 cases of active TB.[16]

Vaccines and Vaccine Preventable Illnesses

Some diseases, like polio and diphtheria, are rare in the United States thanks to immunizations. Vaccines are the most cost-effective clinical preventative service to reduce infections. Vaccines save 33,000 lives, prevents 14 million cases of disease and reduces health care costs by $9.9 billion. Although we have vaccines available in the US, about 42,000 adults and 300 children die each year from vaccine-preventable diseases. Recently, there have been outbreaks of measles and pertussis in communities where the population is undervaccinated. In Nashua, the most common vaccine-preventable diseases are varicella (chickenpox), *Streptococcus pneumonia* (invasive disease) and pertussis. From 2009 to 2013 in Nashua, there were 47 probable or confirmed cases of varicella and 25 probable or confirmed pertussis cases.

In the US in 2013, vaccination coverage for children born from January 2010 to May 2012 achieved the 90% Healthy People 2020 target goal for measles, mumps and rubella vaccine (MMR), the hepatitis B vaccine (HepB), the poliovirus vaccine and the varicella vaccine. Coverage was below the 90% target for diphtheria, tetanus and pertussis vaccine (DTaP), the pneumococcal conjugate vaccine (PVC) and the *Haemophilus influenza* type b vaccine (Hib). In 2013, the national vaccination coverage for children 19-35 months was 83.1% for ≥4 DTap doses, 92.7% for ≥3 poliovirus doses, 91.9% for ≥1 MMR dose, 82% for the full series of Hib, 90.8% for ≥3 HepB doses, 91.2% for ≥1 varicella dose, and 82% for ≥4 PCV doses. In 2013 in New Hampshire, children in this age group met the 90% target for MMR (96%) and DTaP (91%). Another Healthy People 2020 goal is to increase the percent of newborns receiving a birth dose of HepB to 85%. Nationally, 74% received this birth dose and in NH 74% received the birth dose (Table 7.3).

Table 7.3 Estimated Vaccination Coverage in Children 19-35 months

Geography	MMR (≥1dose) HP2020 Goal: 90%	DTaP (≥4doses) HP2020 Goal: 90%	HepB Birth HP2020 Goal: 85%	HepA (≥2doses) HP2020 Goal: 85%	Rotavirus HP2020 Goal: 80%
US	91.9%	83.1%	74.2%	54.7%	72.6%
NH	96.3%	91.3%	74.1%	53.3%	78.2%
MA	95.8%	93.3%	78%	62.7%	84%
Source: CDC, National Immunization Survey, US, 2013					

In the US, the percentage of children who received no vaccinations is below 1% and children living below the federal poverty level had lower vaccination coverage compared with children above the poverty level. Additionally, in 2013 in the US, African American children had lower coverage compared to Caucasian children for ≥3 and ≥4 DTap doses, Hib, ≥4 PCV doses, rotavirus, and the combined vaccine series. However, African American and Hispanic children had higher coverage than Caucasian children for the Hepatitis B vaccine.

It is recommended that adolescents receive the tetanus (Td) or tetanus/pertussis (Tdap), meningococcal (MCV4) and human papillomavirus (HPV) vaccines as part of their routine adolescent visits because the vaccines received in childhood begin to weaken. There are many reasons why protection against tetanus, meningococcal disease and human papillomavirus is important. Tetanus is a serious disease that leads to tightening of the muscles and can lead to death in one out of ten cases. Meningicoccal disease is caused by the bacteria, *Neisseria meningitidis*, and the case fatality rate for this disease is 10-14% with antibiotic therapy. One of the high risk groups includes those living in closed quarters such as dormitories and military barracks. The Human Papillomavirus (HPV) is one of the most commonly transmitted sexual diseases, causes genital warts and is the leading cause of cervical cancer in women. In 2010, the American Cancer Society estimated that over 12,200 women will be diagnosed and 4,210 will die from cervical cancer in the United States.[24]

The Healthy People 2020 objective is to increase vaccine coverage for adolescents for the tetanus, meningococcal and HPV vaccines to 80%. New Hampshire meets this target for the tetanus vaccine with 88% (CI 82.7-91.8%) coverage. However, New Hampshire does not meet the Healthy People 2020 objective for the meningococcal vaccine with 68% coverage and the HPV vaccine with 40% coverage for all three shots in the HPV vaccine series.[24]

Influenza

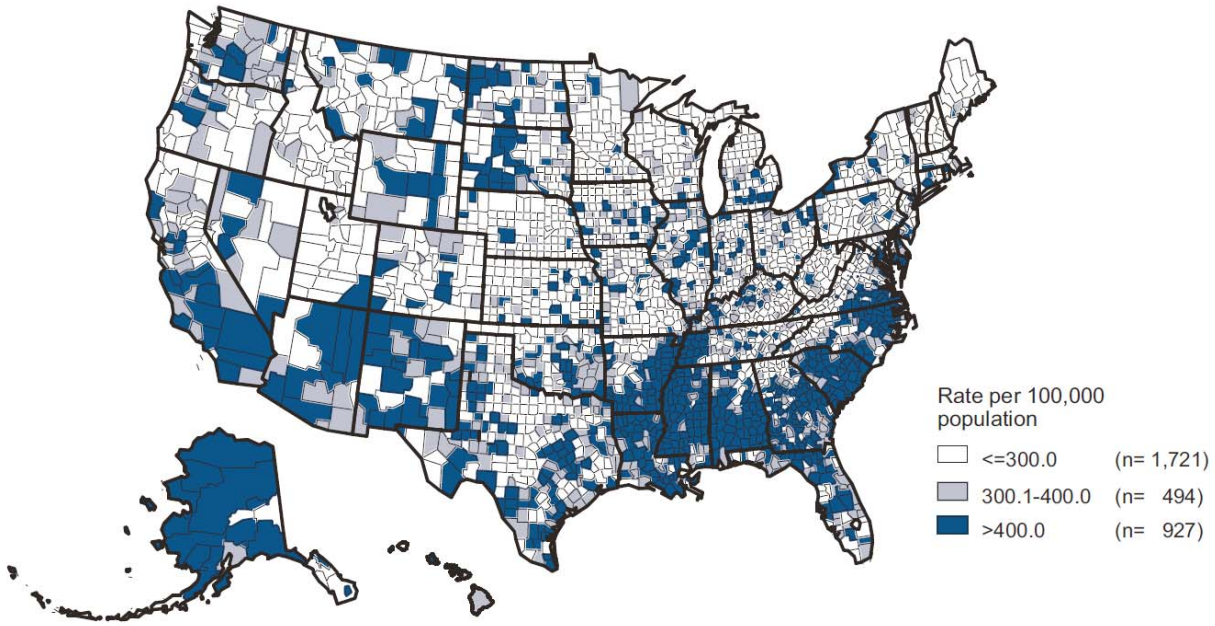
Influenza causes 3,000 to 49,000 deaths every year and certain people are at greater risk for complications from influenza including young children, pregnant women and individuals with chronic conditions or a weak immune system. Current recommendations are for anyone over 6 months of age without a contraindication to get the influenza vaccine every year. The Healthy People Goal is to have 70% of the population 6 months and older receiving the influenza vaccine annually. Additionally, it is recommended that individuals with chronic conditions, smokers or individuals over 65 years of age receive the pneumococcal vaccine to prevent illness from *Streptococcus pneumoniae* a bacteria that causes pneumonia, ear infections and meningitis. From 2009 to 2013 in Nashua, there were 45 cases of invasive disease of *S. pneumoniae*. The Healthy People 2020 goal is to increase the percent of adults 65 years and older vaccinated for *S. pneumoniae* to 90%. In 2012 in NH, 59% of adults over the age of 65 years received an influenza vaccine and 91% received a pneumococcal vaccine. In 2012, only 40% of asthmatics in NH received an influenza vaccination and only 47% received a pneumococcal vaccination.

Sexually Transmitted Infections

In the Unites States, young adults ages 15 to 24 make up 24% of the sexually active population and account for 50% of the 20 million new sexually transmitted infections (STIs). Undiagnosed STIs cause 24,000 women to become infertile and many do not know they are infected because STIs often have no symptoms. Individuals can protect themselves by getting tested, reducing risky behaviors and getting vaccinated with the HPV vaccine. In 2012 there were 1,422,976 cases of chlamydia in the US which is the largest number of cases reported to the CDC for any condition. The rate among women was over two times the rate for men and the rate in African Americans was 6.8 times the rate in Caucasians. The rates of chlamydia in NH are lower than other parts of the country such as the southeast and south west

(Figure 7.9). The rates of gonorrhea have increased slightly since 2009 and in 2012 there were 334,826 cases nationally. Antimicrobial resistance remains a threat in the treatment of gonorrhea with an increased resistance to fluoroquinolones, a type of antibiotic. The rate of primary and secondary syphilis has decreased dramatically but there are still small geographic pockets in the country with syphilis. The rate among African Americans was 6 times than the rate for Caucasians with African Americans ages 15-19 years most disproportionately affected by syphilis.[25]

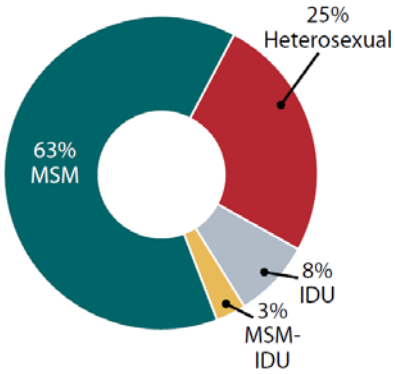
Figure 7.9 Chlamydia Rates by County, United States, 2012



Source: CDC

Additionally, there were an estimated 47,500 people newly infected with the human immunodeficiency virus (HIV) in the US in 2010 and the incidence of HIV has remained steady with about 50,000 new infections each year. African Americans, Latinos and gay and bisexual men continue to be disproportionately affected by HIV. However, there is a decreasing trend of new HIV infections among African American women. Men who have sex with men are the most affected by HIV as they represent 4% of the population but make up 78% of new HIV infections among men and nearly 63% of new infections in 2010.

Figure 7.10 Estimated New HIV Infections by Transmission, 2010



In NH, there have been increases in chlamydia and gonorrhea over the past five years and syphilis and HIV have had stable case counts the past five years. In NH in 2012, there were 3,070 cases of chlamydia with 2,151 of these cases in women and 1,354 of these cases in young adults 20-24 years of age. In 2012 in Hillsborough County, there were 1,056 cases and in Nashua there were 228 cases of chlamydia. Nashua and Manchester make up the bulk (73%) of cases in Hillsborough County. The rate of chlamydia infections in

Nashua (262 per 100,000) is about ½ of the rate for the United States (456 per 100,000) and similar to Hillsborough County (262 per 100,000). In NH in 2012 there were 148 cases of gonorrhea and in Nashua there were 9 cases. The rate of gonorrhea in NH is lower than the rate in the US (98 per 100,000) and the rate in Nashua (10.4 per 100,000) is about the same as NH (11.2 per 100,000). There were 49 cases of syphilis in NH in 2012 and 3 cases in Nashua. The rate of syphilis in NH is 3.7 per 100,000 and the rate in the US is 5.0 per 100,000 (Table 7.4).

Similar to national trends, men who have sex with men make up a majority of newly diagnosed HIV infections with about 120 cases from 2008-2012. There were 49 new infections with HIV in NH in 2012 and 26 in Hillsborough County. The rate of HIV was 6.5 per 100,000 in Hillsborough County in 2012 and 3.7 per 100,000 in NH. In 2012, there were 27 new diagnoses of AIDS in NH and 12 in Hillsborough County. About 40% of these cases received a concurrent diagnosis of HIV and AIDS meaning they received an AIDS diagnosis within 12 months of an initial HIV diagnosis.

Table 7.4 Rates of Sexually Transmitted Diseases by Geography, 2012^

	Chlamydia (per 100,000)	Gonorrhea (per 100,000)	Syphilis (per 100,000)	HIV (per 100,000)
Geography				
US	456.7	98	5.0	19.1 (2011)
NH	232.4	11.2	3.7	3.7
Hillsborough	262.1	16.6	6.2	6.5
Manchester	493.6	39.0	14.5	*
Nashua	262.3	10.4	*	*
Gender				
NH Males	140.9	12.9	7.5	5.8
NH Females	321.8	9.6	0.0	1.6

*Source: CDC, NH DHHS; *=number of cases too small to release or calculate; ^=unless otherwise indicated.*

Adolescents and Sexual Behavior

Educating adolescents on prevention of STIs is an important component of reducing STIs. In the Greater Nashua Public Health Region (GNPHR), about 40% of high school students have had sexual intercourse and 31.6% have had sexual intercourse with more than one person in the past 3 months (Table 7.5). There are differences by grade with 23% of 9th grade students from the Nashua high schools that had sexual intercourse compared with 64% of 12th graders (Figure 7.11). Of GNPHR high school students that had sexual intercourse 21% drank alcohol or used drugs beforehand, 62% used a condom and 26%

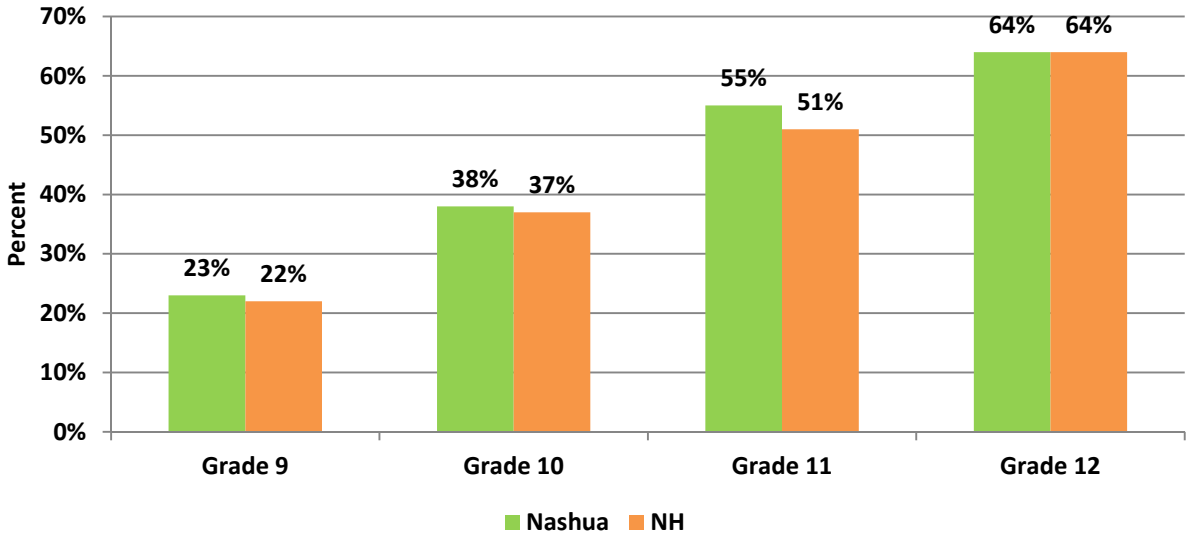
used birth control to prevent pregnancy.

Table 7.5 Sexual Behavior for High School Students, 2013

	Nashua	GNPHR	NH
Percentage of students who had sexual intercourse	44.2%	40.4%	42.3%
Percentage of students who had sexual intercourse with one or more people during the past 3 months	34.5%	31.6%	33.5%
Among students who had sexual intercourse, the percentage that drank alcohol or used drugs beforehand	20.8%	21.2%	20.3%
Among students who had sexual intercourse, the percentage who used a condom during last sexual intercourse	63.4%	62.5%	62.7%
Among students who had sexual intercourse, the percentage who used birth control pills to prevent pregnancy	22.4%	26%	27.3%
Source: NH DHHS; YRBS			

About 21% of high school students in the Greater Nashua Public Health Region used alcohol or drugs before having sexual intercourse.

Figure 7.11 Percent of High School Students Who Had Sexual Intercourse by Grade



Source: YRBS

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